REMARKS

Claims 1-30 have been examined. Claims 1, 7, 13, 17, 21 and 23 are amended. Claims 25-30 are cancelled without prejudice or disclaimer. Applicants reserve the right to pursue these canceled claims in a divisional or continuation application. The amendments to Claims 13, 17, 21 and 23 are grammatical in nature. Support for the amendments to Claims 1 and 7 can be found, *inter alia*, at paragraphs [0143]-[0146] of the in the present specification. (Note, the indicated numbers of the paragraphs are those of Patent Publication No. U5 2004/0081343.)

In the section, "Objections to the Specification", in the Office Action (at page 5, paragraphs 8-9 thereof), the Examiner pointed out that the specification should be revised carefully in order to comply with 35 U.S.C. § 112 because the description is unclear.

In response thereto, Applicants file simultaneously herewith a Submission of Substitute Specification (along with a Marked-up and Clean version of the specification).

Hence, the submission of a substitute specification; amendments to Claims 1 and 7; and cancellation of Claims 25-30 do not constitute new matter, and thus entry is respectfully requested.

I. Objections to the Claims

Claims 29 and 30 have been objected to under 35 U.S.C. § 132(a) for introducing new matter. Since claims 29 and 30 are canceled, the objection is moot.

II. Objections to the Specification

With respect to the objection to the specification, the Examiner continues to assert that the specification should be corrected such that that all terms, which are not clear, concise and exact are removed or corrected such that the specification can be properly understood. We suggest traversing the rejection as follows.

The Examiner asserts that the application and is replete with terms, which are not clear, concise and exact. As an example, the Examiner cites page 5, lines 7-10, of the specification, which reads:

> The pattern, which is detected by the abnormal pattern candidate detection processing systems, is the candidate for the abnormal pattern, and a person, such as a medical doctor, by himself finally makes a judgment as to whether the abnormal pattern candidate having been detected by the abnormal pattern detection processing systems is or is not a true abnormal pattern.

In particular, the Examiner states that "if a newly filed application obviously fails to disclose an invention with the clarity required by 35 U.S.C. § 112, revision of the application should be required" (MPEP section 608.01 [R-5]). According to MPEP section 608.10, the specification must be in such full, clear, concise, and exact terms as to enable any person skilled in the art or science to which the invention pertains to make and use the same. See 35 U.S.C. 112 and 37 CFR 1.71. Applicants submit that the specification does disclose the invention with clarity. That is, a person of ordinary skill in the art would be enabled from the disclosure to make and use the features of the invention disclosed therein. The usage of the terms throughout the specification are consistent within the art and can be readily understood by a person of ordinary skill in the art. Moreover, the terms within the disclosure do not appear that they would obscure the information conveyed to a person of ordinary skill in the

art pertaining to the invention. Therefore, Applicants respectfully request the withdrawal of this objection.

III. Rejections under 35 U.S.C. § 112

Claims 29 and 30 have been rejected under 35 U.S.C. § 112, first and second paragraphs. Since claims 29 and 30 are canceled, the rejection is moot.

Claims 7-12, 17-20 and 23-24 have been rejected under 35 U.S.C. § 112, second paragraph. Specifically, the Examiner states that these claims contain means plus function limitations invoking § 112, 6th paragraph, but no corresponding structure is found in the specification. In response to our arguments, the Examiner asserts:

> Applicants only mention in passing the existence computer aided diagnosis. The application never states that the present invention is being preformed with a computer. Further, Applicants never describe how Applicants would build an "abnormal pattern candidate detection means" or a "malignancy certainty calculation means." Furthermore, even if "a computer which stores algorithms for performing..." was disclosed, it still is insufficient. Applicants do not disclose how to perform such algorithms, such as via machine, software, hardware, user input, or any other means which may be used.

As indicated on page 1, lines 24-26, of the specification, abnormal pattern candidate detection processing systems implemented by computers are described in, for example, Patent Literature 1 (US 5,761,334). One skilled in the art would understand that abnormal pattern candidate detection processing systems utilize an iris filter for detection of a tumor patter candidate embedded in a radiation image by calculating the gradients of the image signal values via steps of algorithms (page 20, lines 14-16; page 21, lines 6-12; and page 22, lines 5-8). Thus, the specification describes an iris filter (iris filter processing), a

morphological filter (morphological filter processing) and processing for calculating the likelihood ration of the Mahalanobis distance as various aspects of the abnormal pattern candidate detection means.

Applicants also submit that the Examiner is being overly rigid in the requirements for an express disclosure of use of a computer for diagnosis purposes. Because the specification clearly suggests computer implementations, this should sufficiently support the computer-assisted description as claimed. *In re Dossel*, 42 U.S.P.Q.2d 1881, 1885 (Fed. Cir. 1997).

IV. Rejection under 35 U.S.C. § 102

Claims 1, 4-7, 10-20 and 25-30 under 35 U.S.C. § 102(b) as being anticipated by Nishikawa. Applicants traverse this rejection.

A. Claims 1, 7, 13 and 17

Claim 1 recites, inter alia, "an index value representing a feature of the abnormal pattern candidate" and that "the degree of certainty about malignancy is determined from a single index value, which is obtained using linear combination of a plurality of indices representing a plurality of feature measures of a calculation object region." Nishikawa discloses that an artificial neural network (ANN) solved multivariate problems by forming a multi-variable (weights) mathematical model on the basis of examples (Col. 20, lines 8-10). In particular, Nishikawa discloses an ANN having an input layer with 8 input units, each reading one of the eight features of Table 1, and having an output layer having a single output unit (Col. 20, lines 26-39). In addition, Nishikawa discloses combining all the extracted features from the image by using the ANN to develop an estimate of the likelihood of malignancy (Col. 32, lines 12-20). In other words, each feature of Nishikawa is merely one factor weighted in calculating the ANN output, which is then converted into a likelihood factor. The ANN of Nishikawa, however, adopts a non-linear combination, whereas in the present invention , a linear combination is adopted. That is, the ANN of Nishikawa is a

general method for calculating a single index value from a plurality of index values using non-linear combination. In the non-linear combination, there is a risk of occurrence of "singular values." In contrast, there is no risk of occurrence of "singular values" in the present invention, because the linear combination is used. Thus, Nishikawa fails to disclose each and every feature of claim 1.

Applicants submit that claim 1 is patentable for at least these reasons

Claims 7, 13 and 17 include analogous, though not necessarily coextensive features presented in claim 1, and therefore, claims 7, 13 and 17 are also patentable for the reasons discussed for claim 1.

B. Claims 4-6, 8-12, 14-16, 18-20 and 25-30

Applicants submit that claims 4-6, 8-12, 14-16 and 18-20 should be patentable at least by virtue of their dependencies upon claims 1, 7, 13 and 17, respectively. In addition, since claims 25-30 are canceled, the rejection is moot.

V. Rejection under 35 U.S.C. § 103(a) over Takeo in view of Cothren

Claims 1-2 and 7-8 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Takeo in view of Cothren. Applicants traverse this rejection.

A. Claims 1 and 7

Claim 1 recites that "the degree of certainty about malignancy is determined from a single index value, which is obtained using linear combination of a plurality of indices representing a plurality of feature measures of a calculation object region." The Examiner concedes that Cothren does not use a single index. However, the Examiner asserts that Takeo teaches a single index (see paragraphs 22 and 29) and that Cothren teaches the idea of

correlating determined values (i.e., the index) to a probability of malignancy by relating empirical data to determine likelihood of malignancy (see column 20, line 58-column 21, line 25).

However, claim 1 recites "outputting information representing the degree of certainty about malignancy with respect to the abnormal pattern candidate together with the information for specifying the position of the detected abnormal pattern candidate," which the Examiner concedes is not taught by Takeo. Cothren, on the other hand, merely teaches displaying the probability that nodes are malignant on the display 69 (col. 20, lined 63-66). Cothren, however, does not teach that the probability of malignancy is displayed together with any other information. In particular, Cothren does not teach displaying the probability of malignancy together with information for specifying the detected abnormal pattern candidate, which includes specifying the position of abnormal pattern candidates. Thus, Cothren does not teach or suggest outputting information representing the degree of certainty about malignancy with respect to the abnormal pattern candidate together with the information for specifying the detected abnormal pattern candidate. Specifically, although Cothren appears to teach displaying the probability that nodes are malignant on the display 69, there is no teaching or suggestion regarding displaying the probability <u>together with the information for specifying the position of the detected abnormal pattern candidate</u>.

Therefore, in view of the above, Cothren fails to correct the deficiencies of Takeo. Applicants submit that claim 1 is patentable for at least this reason.

Also, since claim 7 contains features similar to claim 1, claim 7 should be patentable for reasons analogous to those presented above in conjunction with claim 1.

B. Claims 2 and 8

Applicants submit that claims 2 and 8 should be patentable at least by virtue of their dependencies upon claims 1 and 7, respectively.

VI. Rejection under 35 U.S.C. § 103(a) over Nishikawa in view of Wang

Claims 3 and 9 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Nishikawa in view of Wang. However, Wang does not correct the deficiencies with regards to Nishikawa. Since claim 3 and 9 depend upon claims 1 and 7, respectively, Applicants submit that claims 3 and 9 are patentable at least by virtue of their dependencies.

VII. Allowable Subject Matter

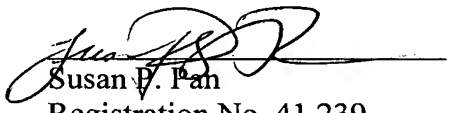
The Examiner indicates that claims 21 and 22 are allowable. Furthermore, the Examiner indicates that claim 23 and 24 would be allowable if all objections and rejections under 35 U.S.C. § 112 were overcome. In view of the foregoing comments in conjunction with 35 U.S.C. § 112, Applicants believe claims 23 and 24 are in condition for allowance.

VIII. Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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